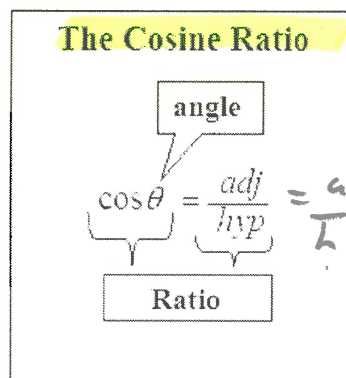
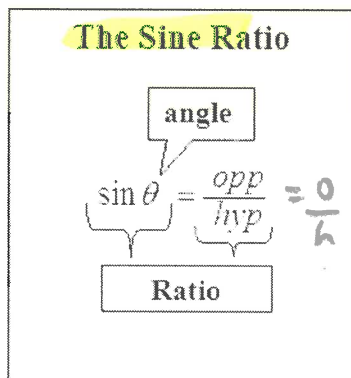
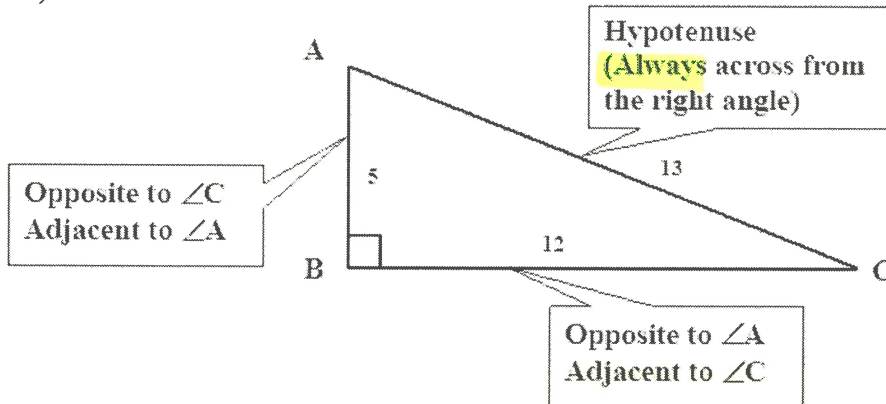


2.4 The Sine and Cosine Ratio

LESSON FOCUS: Develop and apply the sine and cosine ratios to determine angle measures.

Last class we look at the tangent ratio, today we look at the other two trigonometric ratios, the sine and cosine ratios.



sep. 16
SOH CAHTOA

Knowing Your Calculator

Find the following to 3 decimal places.

a) $\sin 27^\circ$ 0.454
0.4539905

b) $\cos 72^\circ$
0.309

Find $\angle H$ to the nearest degree.

a) $\sin H = 0.332$ 19°

b) $\cos H = 0.651$
49°

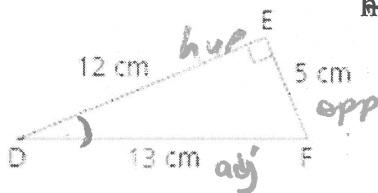
c) $\sin H = \frac{3}{4}$ 41° (3 ÷ 4)
48.599

d) $\cos H = \frac{3}{7}$ 65° (3 ÷ 7)
64.623

Example 1: Determining the Sine and Cosine of an Angle

- a) In $\triangle DEF$, identify the side opposite $\angle D$ and the side adjacent to $\angle D$.

- b) Determine $\sin D$ and $\cos D$ to the nearest hundredth.



$$\sin D = \frac{O}{H}$$

$$\cos D = \frac{A}{H}$$

$$\sin D = \frac{5}{13}$$

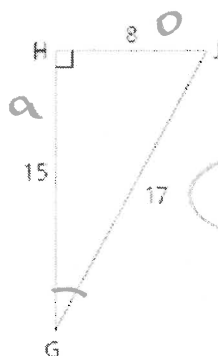
$$\cos D = \frac{12}{13}$$

CHECK YOUR UNDERSTANDING

[Answers: a) HJ, HG, b) $\sin G \approx 0.47$; $\cos G \approx 0.88$]

- a) In $\triangle GHJ$, identify the side opposite $\angle G$ and the side adjacent to $\angle G$.

- b) Determine $\sin G$ and $\cos G$ to the nearest hundredth.



$$\sin G = \frac{O}{H}$$

$$\cos G = \frac{A}{H}$$

$$\sin G = \frac{8}{17}$$

$$\cos G = \frac{15}{17}$$

Example 2: Using Sine or Cosine to Determine the Measure of an Angle

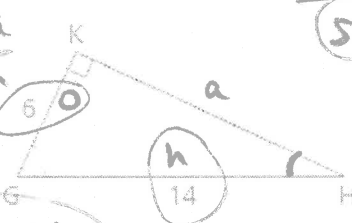
Determine the measures of $\angle G$ and $\angle H$ to the nearest tenth of a degree.



$$\cos G = \frac{A}{H}$$

$$\cos G = \frac{6}{14}$$

$$\angle G = 64.6^\circ$$



$$\sin H = \frac{O}{H}$$

$$\sin H = \frac{6}{14}$$

$$\angle H = 25.4^\circ$$

CHECK YOUR UNDERSTANDING

Determine the measures of $\angle K$ and $\angle M$ to the nearest tenth of a degree.

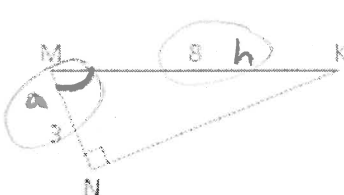
[Answer: $\angle K \approx 22.0^\circ$, $\angle M \approx 68.0^\circ$]



$$\sin K = \frac{O}{H}$$

$$\sin K = \frac{3}{8}$$

$$\angle K = 22.0^\circ$$



$$\cos M = \frac{A}{H}$$

$$\cos M = \frac{3}{8}$$

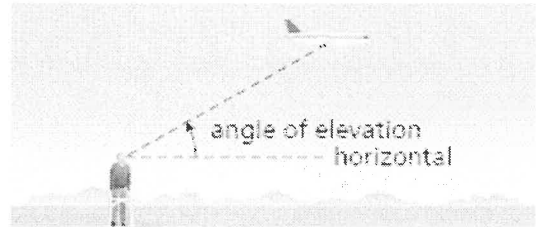
$$\angle M = 68.0^\circ$$

$$67.975$$

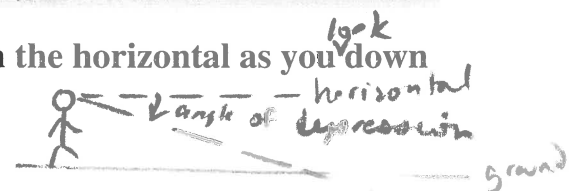
Terms you need to know:

su p. ii

- **Angle of inclination:** The *angle of inclination* of a line is the angle made between the line and the horizontal line which it intersects.
- **Angle of elevation:** The line of sight made with the horizontal as you ^{look} up towards an object.

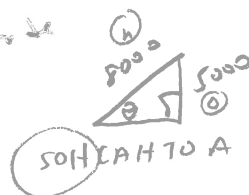
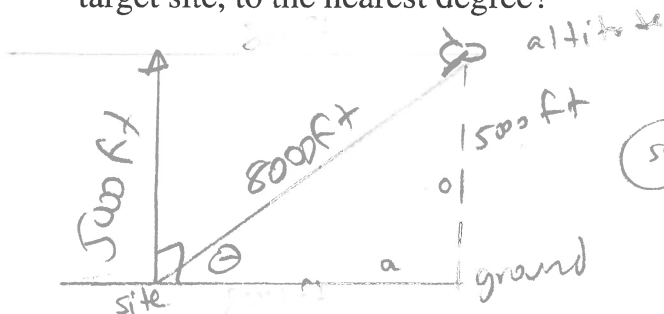


- **Angle of depression:** The line of sight made with the horizontal as you ^{look} down towards an object.



Example 3: Using Sine or Cosine to Solve a Problem

A water bomber is flying at an altitude of 5000 ft. The plane's radar shows that it is 8000 ft. from the target site. What is the **angle of elevation** of the plane measured from the target site, to the nearest degree?



$$\sin \theta = \frac{o}{h}$$

$$\sin \theta = \frac{5000}{8000}$$

$$\theta = 39^\circ$$

$$38.68$$

CHECK YOUR UNDERSTANDING

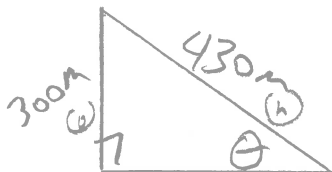
An observer is sitting on a dock watching a float plane in Vancouver harbour. At a certain time, the plane is 300 m above the water and 430 m from the observer. Determine the angle of elevation of the plane measured from the observer, to the nearest degree.

[Answer: approximately 44°]

$$\sin \theta = \frac{o}{h}$$

$$\sin \theta = \frac{300}{430}$$

$$\theta = 44^\circ$$



Homework: Page 95

#4-6, 9-11

4a, 5a, 6a

